

Future of Software

Community-Based Software Development Under Time Pressure

Robert Neches

*Distributed Scalable Systems
University of Southern California
Information Sciences Institute
Marina del Rey, California*

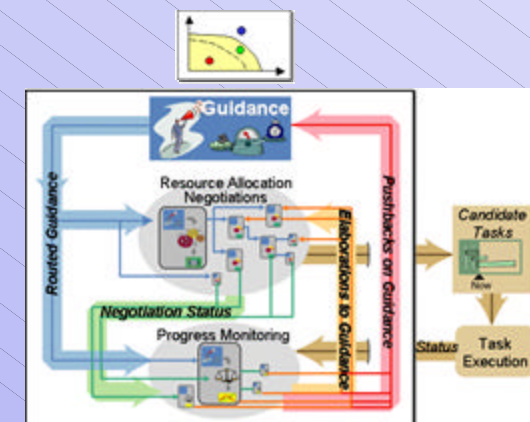
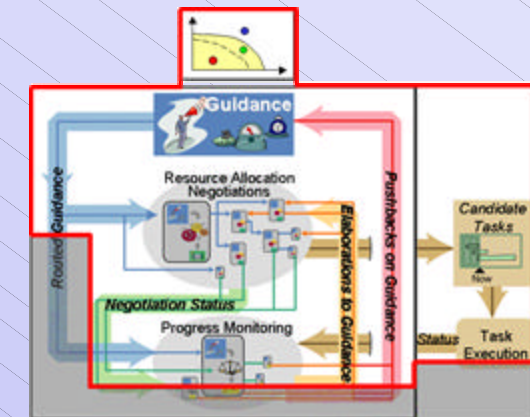
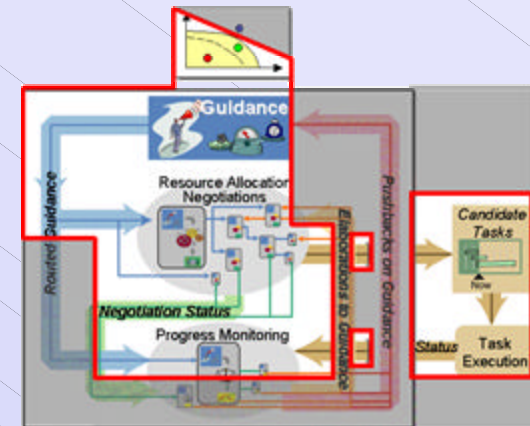
Needs

■ Practical applicability in days/weeks, not months/years

- Better now beats perfect later
- Life's a moving target
- Gotta see it to know if we like it
- Didn't know we wanted it before we got it

■ Challenges

- Make “build it now, fix it later” work
- Put those pesky users in the loop



Emerging Promising Technologies

...it's not top-down structured, nor is it really bottom-up, either. It's really more like assembling a jigsaw puzzle -- you create pieces and lay them out with some blind faith that eventually you'll see how to fit them together.

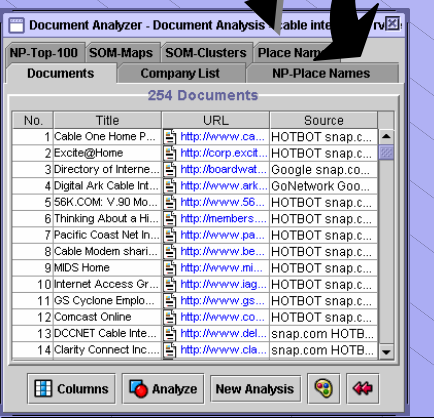
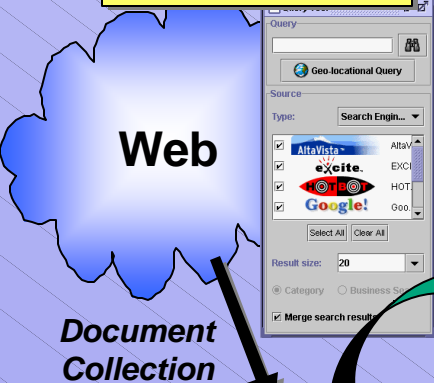
-- Craig Milo Rogers

- Component-based, web-based software
- Extreme programming
- Brute force, complexity, heterogeneity
- Probes, gauges, monitors
- New insights in APIs (read the code)
- New user-centered software development tools

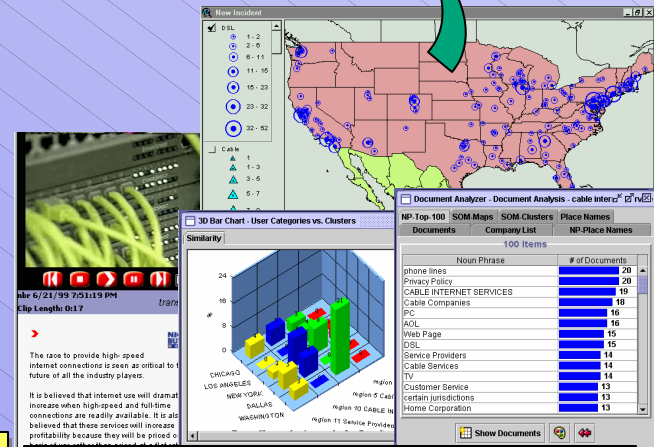
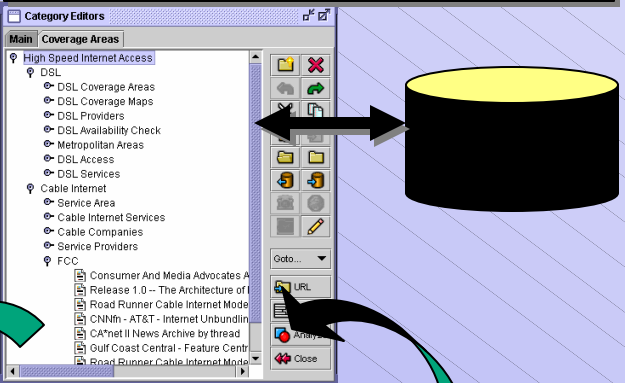
GeoWorlds: Component-Based Architecture



Information Gathering



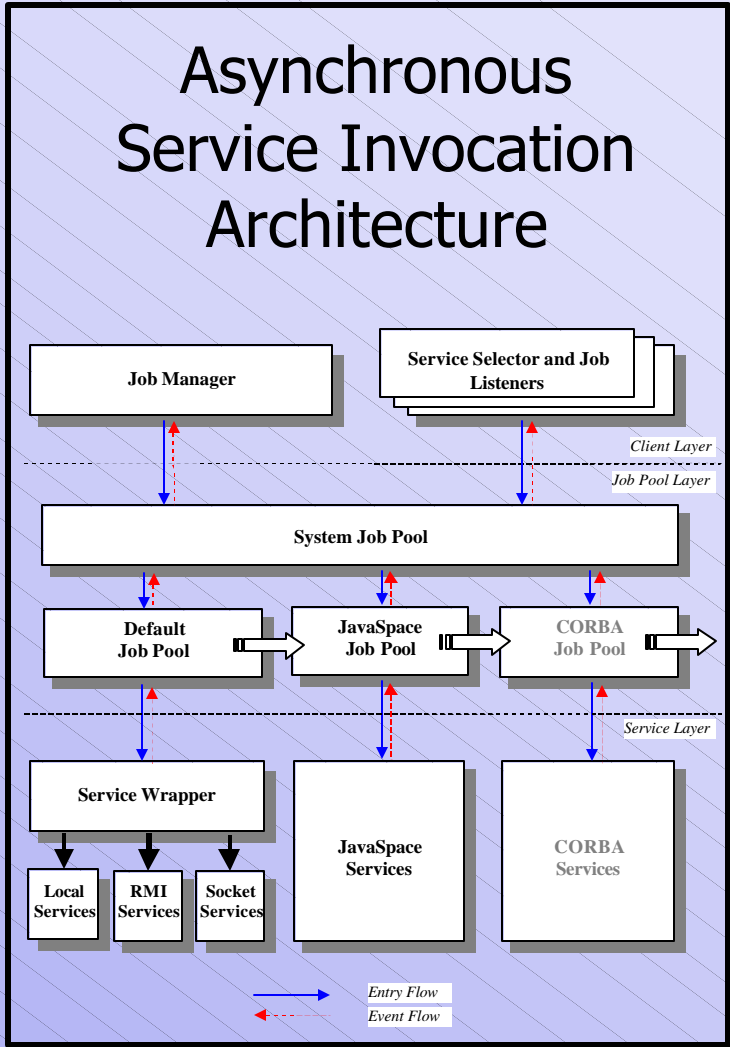
Information Organization



Document Analysis

Information Visualization

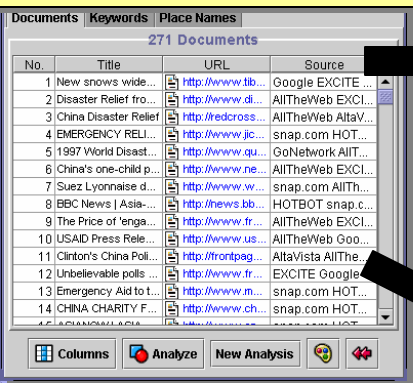
Asynchronous Service Invocation Architecture



Scripting and Data Fusion (In-Young Ko)

Identify Recurring Disaster Areas in China, e.g. Locations of Floods

Retrieve a Web document collection about “China disasters”

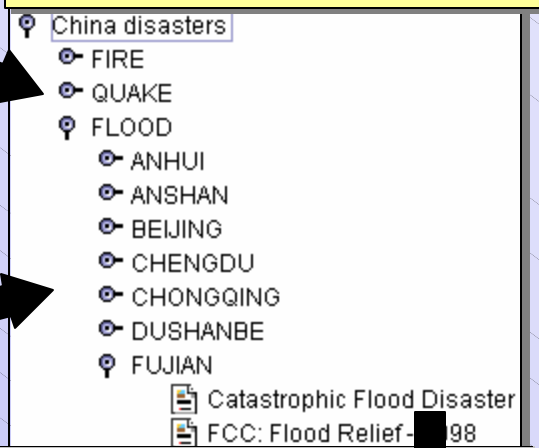


No.	Title	URL	Source
1	New snows wide...	http://www.lib...	Google EXCITE...
2	Disaster Relief fro...	http://www.di...	AltTheWeb EXCL...
3	China Disaster Relief	http://redcross...	AltTheWeb AltaV...
4	EMERGENCY RELI...	http://www.jic...	snap.com HOT...
5	1997 World Disast...	http://www.qu...	GoNetwork AltThe...
6	China's one-child p...	http://www.ne...	AltTheWeb EXCL...
7	Suez Lyonaise d...	http://www.w...	snap.com AltThe...
8	BBC News Asia...	http://news.bb...	HOTBOT snap.c...
9	The Price of 'enga...	http://www.fr...	AltTheWeb EXCL...
10	USAID Press Rele...	http://www.us...	AltTheWeb Goo...
11	Clinton's China Poli...	http://frontpag...	AltVista AltThe...
12	Unbelievable polls...	http://www.fr...	EXCITE Google...
13	Emergency Aid to t...	http://www.m...	snap.com HOT...
14	CHINA CHARITY F...	http://www.ch...	snap.com HOT...

Classify documents based on the disaster types mentioned

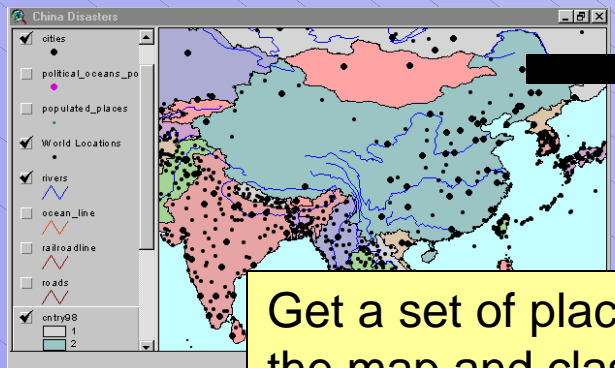
- 
- Document clusters for 'China disaster'
 - QUAKE
 - FIRE
 - FLOODING
 - 1997 World Disaster Reduction
 - USAID Provides Disaster Assi
 - NATIONAL INTERAGENCY COO
 - China Floods Exacerbated By M

Cross-product between place names and the disaster type categories

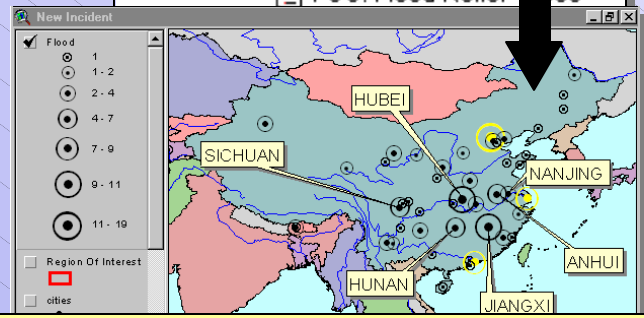
- 
- China disasters
 - FIRE
 - QUAKE
 - FLOOD
 - ANHUI
 - ANSHAN
 - BEIJING
 - CHENGDU
 - CHONGQING
 - DUSHANBE
 - FUJIAN
 - Catastrophic Flood Disaster
 - FCC: Flood Relief - 1998

- 
- Document clusters for 'China disaster'
 - BEIJING
 - CHENGDU
 - CHONGQING
 - GUANGZHOU
 - HANGZHOU
 - HARBIN
 - HONG KONG
 - JILIN
 - NATIONAL INTERAGENCY COO
 - Catastrophic Flood Disaster in

Get a set of place names from the map and classify the documents based on them



Plot the document clusters on the map to figure out the major flooding areas



Large Apps in a Hurry

GeoWorlds Information Manager (Local Session, No Incident, Untitled InfoSpace, Writable)

File Edit View Collaboration Documents Categories Tools Help

New Script Delete Script Alternative Services Close Viewer

Scripts

Collection Edit Analyser FanOut Analyser Index Filter Brancher Branching Converter Flattening Cat Analyser Noun Phrase Converter Format Conve Join Entropy Ranki

Place Hierarchy Converter Flattening Cat Analyser Place Hierarchy Analyser Cross Product

Custom Categories

Analytic Visual Information Source Branching Joining

Analytic Service

- Keyword Extraction
- NounPhraseExtraction
- CompanyNameExtraction
- CategoriesToKeywordsConversion
- ExtractKeywordsFromCategories
- DocumentClassification
- DocumentSummarization
- LanguageIdentification
- CategoryManipulation
- CategoryFanOut
- CategoryComparison
- SimilarityDivisibilityComparison

Service Schema

URL: http://www.isi.edu/geoworlds NounPhraseExtraction

Short Name:

Description: Service that extracts a set of noun phrases from a document collection.

Superclass: KeywordExtraction

Input Data:

Name	Content	Structure
Input1	DocumentCollection	

Output Data:

Name	Content	Structure
Output1	NounPhrases	

Scripting Tool

Stop 1 document(s)

GeoTopics, Thursday, October 25, 2001 11:00 AM PDT - Netscape

File Edit View Go Communicator Help

Bookmarks Netsite http://www.isi.edu/geoworlds/geotopics/bydate/date.200110251100/ What's Related

GeoTopics

The hot topics around the world brought to you by GeoWorlds
A RESEARCH PROJECT OF
University of Southern California
School of Engineering
Information Sciences Institute
Distributed Scalable Systems Division

Home About Us Contact Us Credits How it works News media included First time users Help

Previous Thursday, October 25, 2001 11:00 AM PDT Next

Top 20 Topics

- 1 [2] Andhras Cases (97)
- 2 [1] Terror Attacks (88)
- 3 [NEW] Attacks on Afghanistan... (60)
- 4 [5] Taliban Residue (62)
- 5 [4] Osama bin Laden (60)
- 6 [1] George W. Bush (49)
- 7 [13] War on Terrorism (41)
- 8 [NEW] Northern Alliance (39)
- 9 [9] World Trade Center (33)
- 10 [6] Biochemical Attacks (33)
- 11 [8] White House (28)
- 12 [17] Economic Recovery (24)
- 13 [12] FBI (21)
- 14 [15] Public Health (20)
- 15 [16] Bush administration (20)
- 16 [NEW] Windows XP (10)
- 17 [NEW] United Nations (19)
- 18 [NEW] Secretary of State Co... (20)
- 19 [10] Senate Majority Leade... (18)
- 20 [NEW] Former President Clia... (17)

Top 20 Places

- 1 [1] UNITED STATES (172)
- 2 [2] NEW YORK (87)
- 3 [3] AFGHANISTAN (78)
- 4 [4] PAKISTAN (47)
- 5 [11] KABUL (33)
- 6 [5] WASHINGTON D.C. (34)
- 7 [9] LOS ANGELES (16)
- 8 [12] SAN FRANCISCO (24)
- 9 [10] CHICAGO (76)
- 10 [14] IRAQ (18)
- 11 [8] ISRAEL (19)
- 12 [8] LONDON (18)
- 13 [17] GERMANY (15)
- 14 [NEW] IRAN (15)
- 15 [15] UNITED KINGDOM (15)
- 16 [7] MIAMI (21)
- 17 [NEW] FRANCE (12)
- 18 [NEW] ITALY (11)
- 19 [18] SAUDI ARABIA (11)
- 20 [20] WEST BANK (12)

Legend

- Same rank
- Moving up
- Number of articles
- Articles on Thursday, October 25, 2001 11:00 AM PDT
- New today
- Moving down
- Rank yesterday
- Articles on Wednesday, October 24, 2001 7:00 PM PDT

World map showing global distribution of topics and places.

Document: Done

New Directions

...Actually, I'd rather there weren't any comments. If I want to know what it does, I'm better off reading the code.

-- Pedro Szekely

- Extraction / reverse engineering / re-engineering tools
- Wrapper generators
- Run-time monitoring and repair
- Structure modeling and mapping
- Collaborative requirements refinement